

CS59-36

Dress Fabrics, Woven; Testing and Reporting.

U. S. DEPARTMENT OF COMMERCE

DANIEL C. ROPER, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

WOVEN DRESS FABRICS TESTING AND REPORTING

COMMERCIAL STANDARD CS59-36

Effective as a Basis for Testing and Reporting From April 15, 1936



A RECORDED STANDARD OF THE INDUSTRY

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PROMULGATION
of
COMMERCIAL STANDARD CS59-36
for
**WOVEN DRESS FABRICS: TESTING AND
REPORTING**

On September 27, 1935, at the instance of the National Retail Dry Goods Association, a general conference of representatives of commercial testing laboratories, manufacturers, distributors, and users of woven dress fabrics adopted a recommended commercial standard covering methods of testing and reporting on these commodities. The industry later accepted and approved for promulgation by the United States Department of Commerce, through the National Bureau of Standards, the standard as shown herein.

The standard is effective as a basis for testing and reporting from April 15, 1936.

Promulgation recommended.

I. J. Fairchild,
Chief, Division of Trade Standards.

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Daniel C. Roper,
Secretary of Commerce.

WOVEN DRESS FABRICS: TESTING AND REPORTING

COMMERCIAL STANDARD CS59-36

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I. SCOPE

1. This standard provides methods of testing woven dress fabrics and reporting with reference to breaking strength, color fastness to crocking (rubbing), cleaning (dry and wet), dry pressing, laundering, light, shrinkage in laundering and cleaning (dry and wet), and yarn slippage.

II. PURPOSE

2. The purposes are to provide standard methods of testing woven dress fabrics from the standpoint of serviceability and a uniform basis for reporting results of tests, for the guidance of testing laboratories in order to eliminate confusion resulting from a diversity of testing methods. It is expected that comparability and reproducibility of test results will be attained thereby for the benefit of producers, distributors, and users.

III. GENERAL REQUIREMENTS

3. *Sampling.*—Normally, tests will be conducted and reports issued as representative only of the sample submitted, without reference to the method of sampling or size of lot represented. When samples are to represent given lots, the method of sampling and sizes of the lots represented shall be as agreed upon between the client and the testing laboratory.

4. *Size of sample.*—The sample selected from piece goods for test purposes shall be of sufficient size for the tests required. It is estimated that 2 square yards are required to make all of the tests prescribed herein.

5. *Kinds of tests required.*—Unless otherwise required by the client, the testing laboratory will conduct and report on all tests covered herein, in accordance with the following procedure.

IV. BREAKING STRENGTH

6. *Test specimens.*

6a. Ten specimens in the warp direction and 10 specimens in the filling direction shall be cut in such a manner that 2, but not more than 2, test specimens of each set contain the same yarn (warp or filling) and that no specimen is taken nearer the selvage than one-tenth the width of the material. Each test specimen shall be 4 inches wide and not less than 6 inches long in the direction in which the strength is to be determined.

6b. Five specimens in the warp direction and five specimens in the filling direction, of which no two specimens contain the same yarn, shall be used for determining the breaking strength of the material under standard atmospheric conditions and the remaining specimens for determining the breaking strength of the material in a wet state.

7. *Testing machine.*

7a. A motor-driven pendulum machine or a constant rate-of-load machine shall be used.

7b. The faces of the front members of the jaws shall measure 1 by 1 inch, and the faces of the back members shall measure 1 inch in the direction of the application of the load and 2 inches or more perpendicular to the direction of the application of the load. The jaws shall have smooth, flat faces with edges very slightly rounded to prevent cutting, and they shall be pivoted to take the direction of the load force easily and smoothly.

7c. If a pendulum machine is used, it shall be of such capacity that when the specimen breaks, the angle between the pendulum and the vertical is between 4 and 45°. The jaws through which the load is applied shall move at a uniform rate of 12 ± 2 inches per minute.

8. *Procedure.*

8a. *Standard conditions.*—One set of test specimens, as described in paragraph 6b, shall be placed in an atmosphere having a relative humidity of 65 percent at 70° F (21° C) for at least 4 hours. A tolerance of ± 2 percent is permitted in relative humidity and $+ 10^\circ$ F (6° C) in temperature. In cases of dispute, tests shall be conducted on test specimens which are in equilibrium with the foregoing standard atmosphere. Material shall be considered to be in equilibrium when it shows no progressive change in weight.

8b. *Breaking strength—standard conditions.*—The first set of test specimens prepared in accordance with paragraph 8a shall be tested for breaking strength as outlined in paragraph 8c.

8c. With the distance between the two pairs of jaws of the testing machine adjusted to 3 inches, the test specimen shall be placed symmetrically in the jaws with the long dimension parallel to and the short dimension at right angles to the direction of the application of the load. Caution shall be exercised to see that the same yarns are

clamped by both pairs of jaws. If a specimen slips in the jaws, breaks in the jaws, breaks at the edges of the jaws, or for any reason attributable to faulty operation, the results vary markedly from the average for the set, the result shall be disregarded, another specimen shall be taken and the result of its break included in the average.

8d. *Wet breaking strength*.—The second set of test specimens, as described in paragraph 6b, shall be immersed in water at room temperature for 2 hours. The specimens shall be removed, one at a time, and tested immediately for breaking strength in accordance with the method outlined in paragraph 8c. The testing of the specimen shall be completed within 1 minute after its removal from the water.

8e. The breaking strength, standard conditions or wet, in the warp or filling direction is the average of the loads required to break the five specimens cut in that direction.

9. *Reporting breaking strength*.—The warp and filling breaking strengths, standard conditions and wet, shall be reported separately in pounds to the nearest whole number.

V. COLOR FASTNESS TO CROCKING (RUBBING)

10. *Test specimen*.—The test specimen shall be at least 2 by 6 inches.

11. *Dry-cloth test*.—The test specimen is rubbed with an unsized white cotton cloth. This cloth is placed over the index finger and, applying considerable pressure, the finger is passed 10 times over a length of 4 inches on the specimen.

12. *Wet-cloth test*.—The preceding test is repeated with an unsized white cotton cloth containing about 100 percent of its dry weight of water, but not dripping wet.

13. *Color fastness*.—The unsized white cotton cloth is examined for staining. The degree of staining may be determined by visual comparison with the fastness of the standard dyeings tested in the same way and preferably simultaneously.

14. *Reporting color fastness to crocking (rubbing)*.—A fabric from which there is no transfer of color to white cloth either while dry or wet shall be reported as "fast to crocking" (comparable to standard sample DF1). Three degrees of crocking are recognized according to standard samples DF1 to DF3. (See paragraph 66.) The color fastness to crocking of any degree less than DF1 shall be reported as "comparable to standard sample DF____, a standard dyeing of the American Association of Textile Chemists and Colorists."

VI. COLOR FASTNESS TO CLEANING, DRY AND WET

[For color fastness to laundering see sections VIII and IX]

15. *Test specimens*.—Two test specimens, 2 by 4 inches, are required for this test. To each of these two test specimens shall be sewed 1-inch square pieces of white desized cotton, pure dye silk, rayon, acetate, and wool fabrics.

16. *Apparatus*.—A Launder-Ometer or similar machine shall be used, in which 1-pint preserve jars are held with their bases toward a horizontal shaft 2 inches from the center of rotation and the shaft rotated at a speed of 40 to 45 revolutions per minute. A 1/8-inch vent, made by means of small brass tubing, shall be introduced along the sides of the jars or cylinders used in this test.

17. *Cleaning, dry, procedure.*—Each specimen shall be placed in a 1-pint preserve jar containing 100 ml of cleaning solution prepared by mixing together 1,000 parts by volume of Stoddard Solvent,¹ 67 parts of dry-cleaning soap,² 4 parts of water, and 4 parts of tertiary butyl alcohol. The jars shall be closed, placed in the machine, and the machine operated for 25 minutes. The solution in the jars shall then be poured out, any discoloration resulting from the bleeding of the specimen being noted, and 100 ml of fresh Stoddard Solvent without soap, alcohol, or water shall be placed in each jar. The jars shall be returned to the machine which shall then be operated for an additional 10 minutes. The specimens shall then be removed from the jars and, without squeezing, shall be laid out on a horizontal surface, such as a muslin covered frame or screen, and allowed to dry at room temperature. One specimen shall be pressed according to the method of paragraph 19a or 19b, or, if a velvet, steamed in accordance with paragraph 19c. The other specimen shall be treated further according to the following paragraph.

18. *Cleaning, wet, procedure.*—The unpressed specimen from the preceding paragraph shall be placed on a porcelain slab, or piece of slate, and wet with sufficient distilled water at a temperature of 90 to 100° F, containing 1 g of neutral soap per liter, to keep the fabric wetted thoroughly for 15 minutes. The fabric shall then be rinsed by immersing it in a liter of distilled water at a temperature of 90 to 100° F for 5 minutes, removed without squeezing, laid out on a horizontal surface, such as a muslin covered frame or screen, and allowed to dry at room temperature. This specimen shall be pressed according to the method of paragraph 19a or 19b or, if a velvet, steamed in accordance with paragraph 19c.

19. *Pressing.*—Either of the two methods outlined below may be used in the pressing of the specimen.

19a. *Hand pressing.*—When most of the solvent has evaporated, the specimen is laid on a padded ironing board, care being taken to avoid any strain during handling. The specimen is covered with a damp muslin press cloth, weighing 4 to 4½ ounces per square yard, previously saturated with water and wrung out so as to retain moisture equal to approximately 75 percent of its dry weight. Then press with a flatiron having a temperature between 275 and 300° F.³ until dry. The specimen is allowed to lie on a smooth, horizontal surface for 1 hour thereafter at room temperature.

19b. *Steam pressing (for all fabrics except velvets).*—When most of the solvent has evaporated, the specimen is laid on a bed of a flat-bed press, care being taken to avoid any strain during handling. The press should be of a hot-bed or polished metal-top type for flat fabrics, or a cloth-top press for rough crepes. The steam pressure should

¹ The dry-cleaning fluid shall conform to all of the requirements of "Stoddard Solvent, Commercial Standard CS3-28."

² The soap shall be made by dissolving 56 g of caustic potash (KOH) in 100 ml of water. The potassium hydroxide solution shall be poured slowly with constant stirring into a mixture of 340 g of oleic acid and 500 ml of Stoddard Solvent, continuing the stirring for 15 to 20 minutes.

³ A 5- to 6-pound iron with a 1,000-watt heating unit is recommended in order to avoid large fluctuations in temperature. The temperature of the iron can be determined conveniently with the aid of a calibrated thermocouple, a thermometer inserted in a well in the iron, or alloys melting at approximately 275 and 300° F. It must be remembered in using the second method that there may be considerable lag between the temperature indicated by the thermometer and the actual surface temperature of the iron; and in using the second and third methods, that the iron may be cooled by contact with the cloth. Alloys of tin, lead, and bismuth in the proportions 16:25:16 and 9:8:4 melt at approximately 277 and 298° F, respectively. If small particles of these alloys are placed on the iron, the one alloy will melt and the other will not if the iron temperature is within the required range. Temperature indicators furnished as an integral part of some irons should be calibrated for accuracy.

be between 55 and 65 pounds. The head of the machine is lowered and held in contact with the fabric. During this period steam shall be admitted from the buck of the press for a period of from 3 to 5 seconds. The specimen is allowed to lie on a horizontal surface for 1 hour thereafter at room temperature.

19c. *Steaming (for velvets).*—When most of the solvent has evaporated from a velvet test specimen, cleaned according to paragraphs 17 and 18, the specimen should be spread out on a steam board or table⁴ on a damp muslin press cloth weighing 4 to 4½ ounces per square yard previously saturated with water and wrung out so as to retain moisture equal to approximately 75 percent of its weight. Steam shall then be turned on and allowed to pass through the velvet for 2 minutes. The test piece shall then be cooled to room temperature and allowed to lie in a smooth horizontal position for 1 hour thereafter.

20. *Reporting color fastness in cleaning, dry and wet.*

20a. *Cleaning, dry.*—A fabric shall be reported as “fast to cleaning, dry” if when tested according to the procedure in paragraph 17, there is no change in color of the tested specimen in comparison with the original fabric or staining of any of the white materials affixed to the test specimen. Any change in appearance aside from color shall be reported.

20b. *Cleaning, wet.*—A fabric shall be reported as “fast to cleaning, wet” if when tested according to the procedure in paragraph 18, there is no change in color of the tested specimen in comparison with the original fabric or staining of any of the white materials affixed to the test specimen. Any change in appearance aside from color shall be reported.

VII. COLOR FASTNESS TO DRY PRESSING

21. *Procedure.*—A specimen is pressed for 10 seconds with a flatiron having a temperature between 275 and 300° F⁵ at the point and allowed to rest for 2 hours. The specimen so pressed is compared with a piece of the fabric not pressed.

22. *Reporting color fastness to dry pressing.*—A fabric which shows no change in color shall be reported as “fast to dry pressing.”

VIII. COLOR FASTNESS TO LAUNDERING OF COTTON AND LINEN DRESS FABRICS

23. *Test specimens.*—Three test specimens, each 2 by 4 inches, shall be taken for this test. To each of these test specimens shall be sewed 1-inch square pieces of white, desized cotton, pure dye silk, rayon, acetate, and wool fabrics. Each of the three test specimens shall be subjected to a different one of the three tests outlined below.

24. *Washing machine.*—A Launder-Ometer or similar machine in which 1-pint-preserve jars are held with their bases toward a horizontal shaft 2 inches from the center of rotation and the shaft rotated at a speed of 40 to 45 revolutions per minute, shall be used. Provision shall be made for maintaining the initial temperature of the jars by rotating them in a water bath which can be heated.

⁴ A steam board or table is a board or table of perforated metal, well padded with cotton or other absorbent material. The perforations are of suitable size and so spaced as to allow an even dispersion of steam through the padding.

⁵ See footnote 3, page 4.

25. *Test no. 1. Washing with aid of bleaching agent.*

25a. The specimen to be tested is placed in a 1-pint glass jar containing 100 ml of soda-soap solution heated to 160° F. (71° C), 1 ml of hypochlorite of soda solution containing 1 percent of available chlorine, and ten ⅜-inch rubber balls.⁶ The soap solution shall consist of 5 g of a good grade of 88-percent neutral chip-soda soap and 2 g of 58 percent soda ash per liter. The soap solutions are made up on the basis of 88 percent of soap, although an equivalent amount of soap having a higher or lower strength may be used. It is essential to know by chemical analysis the strength of the hypochlorite of soda solution used at time of using. The commercial product testing 10 percent of available chlorine, as sold for laundry use, is a convenient product for this test.

25b. The jar is closed and placed in a Launder-Ometer or similar machine, which is half filled with water at 160° F (71° C). The machine is operated for 15 minutes. The contents of the jar are emptied, and an equal amount of fresh solution of soap, soda, and hypochlorite, at the same temperature, is added, and the above treatment repeated for another 15 minutes; the jar is again emptied and the specimen rinsed with 200 ml of water at 160° F (71° C) for 10 minutes. The jar is emptied again and the specimen treated with 200 ml of water at 80° F (27° C), containing 0.05 percent of acetic acid. The jar is shaken by hand and then permitted to stand for 10 minutes. The contents are emptied, given a final rinse with 200 ml of cold water, hydroextracted or wrung, and dried by pressing with a flatiron having a temperature between 275 and 300° F.⁷

26. *Test no. 2. Washing without aid of bleaching agent.*—The test is conducted the same as test no. 1, except that the hypochlorite of soda is omitted, and only one soaping treatment of 30 minutes is given.

27. *Test no. 3. Washing with neutral soap.*—This test is conducted according to the same general procedure of test no. 1, but is much milder than either test no. 1 or 2. The soap solution contains 1 g of soap to the liter and no soda ash or chlorine. Rubber balls⁸ are used. The temperature of the soaping treatment and the first rinse is 105° F (40.5° C).

28. *Color fastness.*—The color of the washed specimen is compared with that of the original fabric and the white swatches are examined for staining. The color fastness may be determined by a visual comparison with the fastness of the standard dyeings tested in the same way and preferably simultaneously.

29. *Reporting color fastness to laundering of cotton and linen dress fabrics.*—A fabric which shows a degree of fastness under test no. 1 equal to standard sample DF4 shall be reported as "fast to laundering with the aid of a bleaching agent"; when equal under test no. 2 to standard sample DF5 it shall be reported as "fast to laundering without the aid of a bleaching agent"; and when equal under test no. 3 to standard sample DF6 it shall be reported as "fast to washing with neutral soap." (See paragraph 67.) Staining of each of the white materials shall be reported.

⁶ Fresh or new rubber balls may react with chlorine, thereby vitiating the results of the test. Such balls shall be washed in a separate solution as outlined in paragraph 25a before being used for testing purposes.

⁷ See footnote 3, page 4.

⁸ See footnote 8, this page.

IX. COLOR FASTNESS TO LAUNDERING OF WASH DRESS FABRICS OTHER THAN COTTON AND LINEN

30. *Test specimen.*—A test specimen measuring about 2 by 4 inches shall be taken for the test. To it shall be sewed 1-inch square pieces of white desized cotton, pure dye silk, rayon, acetate, and wool fabrics.

31. *Washing machine.*—A Launder-Ometer, or similar machine, in which 1-pint preserve jars are held with their bases toward a horizontal shaft 2 inches from the center of rotation and the shaft rotated at a speed of 40 to 45 revolutions per minute, shall be used. Provision shall be made for maintaining the initial temperature of the jars by rotating them in a water bath which can be heated.

32. *Washing procedure.*—The specimen prepared as in paragraph 30 is placed in a 1-pint preserve jar to which is added 300 ml of a solution containing 0.5 percent of neutral soap in soft water heated to $100 \pm 2^\circ \text{F}$. The jar is then covered, placed in the machine, and rotated for 30 minutes. The machine is heated to maintain a constant temperature of $100 \pm 2^\circ \text{F}$. The specimen is removed from the jar, rinsed in three changes of water at $100 \pm 2^\circ \text{F}$, rolled in a dry towel or absorbent cotton cloth to remove excess moisture, spread on a padded ironing board, and pressed until dry with a flatiron having a temperature between 275 and 300°F .⁹ The specimen is allowed to lie on a smooth, horizontal surface for 1 hour at room temperature.

33. *Color fastness.*—The color of the washed specimen is compared with that of the original fabric and the white swatches are examined for staining. The color fastness may be determined by a visual comparison with the fastness of the standard dyeings tested in the same way and preferably simultaneously.

34. *Reporting color fastness to laundering of wash dress fabrics other than cotton and linen.*

34a. Fabrics predominately silk or rayon, which show a degree of color fastness equal to that of standard sample DF7 (see paragraph 68a) shall be reported as "fast to laundering." Staining of each of the white materials shall be reported.

34b. Fabrics predominately wool, which show a degree of color fastness equal to that of standard sample DF8 (see paragraph 68b) shall be reported as "fast to laundering." Staining of each of the white materials shall be reported.

X. COLOR FASTNESS TO LIGHT

35. *Test specimen.*—A specimen measuring $2\frac{1}{2}$ by 3 inches is of satisfactory size.

36. *Apparatus.*—The apparatus for this test shall be a type F D A Fade-Ometer¹⁰ or its equivalent. This apparatus consists of a carbon arc enclosed in Pyrex glass, operated on a direct current of approximately 13 amperes or 60-cycle alternating current of approximately 16 amperes, with 140 volts across the arc. The voltage of the power line to the apparatus is 208 to 250 volts. The distance from arc to sample is 10 inches. The air about the samples during exposure is

⁹ See footnote 3, page 4.

¹⁰ Manufactured by the Atlas Electric Devices Co., Chicago, Ill.

humidified and its temperature is automatically controlled. The temperature shall not exceed 105° F for this test.

37. Procedure.

37a. An area of the specimen measuring at least $\frac{3}{4}$ by 1 $\frac{1}{4}$ inches is exposed in the apparatus described above for a sufficient length of time to establish the fastness of the specimen relative to that of the standard dyeings referred to in the next section. It is advisable to expose two areas, one for twice the time of exposure of the other and to expose the standards simultaneously and in the same way. After exposure, the specimen is allowed to lie in the dark at room temperature for 2 hours. The amount of fading is then judged by comparing the exposed and adjacent unexposed areas of the specimen.

37b. *Color fastness.*—The color fastness is determined by a visual comparison of the fading of the specimen with that of the standard dyeings tested in the same apparatus and preferably simultaneously.

38. *Reporting color fastness to light.*—The color fastness of a fabric shall be reported as "comparable to standard sample DF----, a standard dyeing of the American Association of Textile Chemists and Colorists."¹¹ (See paragraph 69.)

XI. COLOR FASTNESS TO PERSPIRATION

NOTE.—The discussion at the general conference of September 27, 1935, and subsequent written acceptances indicate that the recommended test for color fastness to perspiration (identical in substance to the method appearing in the 1934 Yearbook of the American Association of Textile Chemists and Colorists) is perhaps more severe than is required by the normal service of dress fabrics. This recommended test has not been accorded sufficient acceptance to warrant its inclusion in this standard as an accepted standard practice. It is understood that further investigation of the method is under way.

When color fastness to perspiration is reported, the method used shall be cited and the report on same can not be warranted under this standard until a definite method is included therein.

XII. SHRINKAGE IN CLEANING, DRY AND WET

[For shrinkage in laundering, see sections XIII and XIV]

39. *Test specimens.*—Two test specimens are required, one for shrinkage in cleaning, dry, the other for cleaning, wet. The specimens shall be taken no nearer the selvage than one-tenth the width of the fabric. Each shall measure at least 12 by 12 inches. A 10-inch square whose sides are placed parallel with the warp and filling, respectively, of the specimen, is outlined on it preferably with the aid of a rigid templet. The corners and midpoints of each side of the square are marked either with indelible ink applied with a fine pen or with a fine thread sewed into the fabric.

40. *Apparatus.*—The apparatus used shall consist of a cylinder, preferably of metal approximately 13 inches high, having a diameter of about 8 $\frac{3}{4}$ inches (capacity 3 gallons). The cylinder shall be mounted in a vertical position on an axis, which is inclined 50° to the axis of the cylinder, and rotated about this axis at a speed of 45 to 50 revolutions per minute. Provision is made for the cylinder reversing its direction every 3 $\frac{1}{2}$ revolutions.

41. Cleaning procedures.

¹¹ Standard samples for color fastness to light are listed in the order of increasing fastness. The first (standard sample DF9) shows very slight change in color when exposed for 4 $\frac{1}{2}$ hours in the Fade-O-meter. Each successive standard sample is twice as fast to light as the one immediately preceding it.

41a. *Cleaning, dry, procedure.*—The machine is filled approximately one-third full of a cleaning solution prepared by mixing together 1,000 parts by volume of Stoddard Solvent,¹² 67 parts of drycleaning soap,¹³ 4 parts of water, and 4 parts of tertiary butyl alcohol. The two specimens and sufficient suitable worsted cloth¹⁴ in pieces approximately 12 by 12 inches to make a total dry load of 1 pound shall be placed in the machine. It shall be operated for 25 minutes, the solution poured out, and the machine refilled approximately one-third full of fresh Stoddard Solvent without soap, alcohol, or water. The machine shall then be operated for an additional 10 minutes. The specimens shall then be removed and, without squeezing, shall be laid out on a horizontal surface, such as a muslin covered frame or screen. Wrinkles shall be removed by gently pressing the specimens with the palm of the hand. One specimen shall be pressed according to the method of paragraph 42a or 42b, or, if velvet, steamed in accordance with paragraph 42c. The other specimen shall be treated further according to paragraph 41b.

41b. *Cleaning, wet, procedure.*—The unpressed specimen from paragraph 41a shall be placed on a porcelain slab, or piece of slate, and wet with sufficient distilled water at a temperature of 90 to 100° F, containing 1 g of neutral soap per liter, to keep the fabric wetted thoroughly for 15 minutes. The fabric shall then be rinsed by immersing it in a liter of distilled water for 5 minutes, removed without squeezing, laid out on a horizontal surface, such as a muslin covered frame or screen, and allowed to dry at room temperature. This specimen shall be pressed according to the method of paragraph 42a or 42b, or, if a velvet, steamed in accordance with paragraph 42c.

42. *Pressing.*—Either of the two methods outlined below may be used in the pressing of the specimen.

42a. *Hand pressing.*—When most of the solvent has evaporated, the specimen is laid on a padded ironing board, care being taken to avoid any strain during handling. The specimen is covered with a damp muslin press cloth, weighing 4 to 4½ ounces per square yard, previously saturated with water and wrung out so as to retain moisture equal to approximately 75 percent of its dry weight. Then press with a flatiron having a temperature between 275 and 300° F¹⁵ until dry. The specimen is allowed to lie on a smooth horizontal surface for 1 hour thereafter at room temperature.

42b. *Steam pressing (for all fabrics except velvets).*—When most of the solvent has evaporated, the specimen is laid on a bed of a flat-bed press, care being taken to avoid any strain during handling. The press should be of a hot-bed or a polished metal-top type for flat fabrics or a cloth-type press for rough crepes. The steam pressure should be between 55 and 65 pounds. The head of the machine is lowered and held in contact with the fabric. During this period, the steam shall be admitted from the buck of the press for a period of from 3 to 5 seconds. The specimen is allowed to lie on a horizontal surface for 1 hour thereafter at room temperature.

42c. *Steaming (for velvets).*—When most of the solvent has evaporated from a velvet test specimen cleaned according to paragraph 41

¹² See footnote 1, page 4.

¹³ See footnote 2, page 4.

¹⁴ Worsted cloth of plain weave, 2-ply warp and filling, 8 to 8.5 ounces per linear yard, 58 inches wide, Arlington Mills quality no. 2511, scoured but not dyed, is suitable for this purpose.

¹⁵ See footnote 3, page 4.

the specimen should be spread out on a steam board or table ¹⁶ on a damp muslin press cloth, weighing 4 to 4½ ounces per square yard, previously saturated with water and wrung out so as to retain moisture equal to approximately 75 percent of its weight. Steam shall then be turned on and allowed to pass through the velvet for 2 minutes. The test piece shall then be cooled to room temperature and allowed to lie in a smooth, horizontal position for 1 hour thereafter.

43. *Shrinkage.*—The three distances marked in each direction on the specimens are again measured. The average changes in dimensions in the warp and in the filling directions for each specimen are calculated. These are designated the warp and filling shrinkages, respectively, of the specimens.

44. *Reporting shrinkage in cleaning, dry and wet.*

44a. The warp and filling shrinkages in "cleaning, dry" shall be reported separately, in percent, to the nearest whole numbers.

44b. The warp and filling shrinkages in "cleaning, wet" shall be reported separately, in percent, to the nearest whole numbers.

XIII. SHRINKAGE IN LAUNDERING OF COTTON AND LINEN DRESS FABRICS

45. *Test specimen.*—The test specimen shall be at least 20 inches square or at least 20 inches in length and the full width of the material. There shall be marked off accurately on the sample, in both the warp and filling directions, three 18-inch lengths. Suitable marks are obtained with indelible ink or fine threads sewed into the fabric. Care shall be taken to see that the distances are parallel with the yarns.

46. *Washing machine.*—The washing shall be carried out preferably in a reversing wash wheel of the cylindrical type. A suitable type of machine for this test is one having a 20-inch wheel and taking a load of about 3 pounds of dry wash. Provision shall be made for adding to the wheel water at the designated temperature or for heating directly in the wheel by means of live steam. A load which is normal for the machine used is tested at one time. The load may be made up of test specimens and additional cloth as required. The wash solution weighs about 50 times the weight of the load or is sufficient to cover the load in the machine.

47. *Washing procedure.*

47a. An amount of laundry soap of good grade shall be used sufficient to make a good running suds. The soap shall be dissolved before adding it to the wash wheel. A stock solution can be made by thoroughly dissolving 1 pound of chip soap in 1 gallon of hot water. The shrinkage-test procedure requires 60 minutes, and the wash wheel shall be kept running continuously during that time.

47b. The specimens to be tested are placed in the wash wheel and the wheel is started. The water and the steam are turned on, the wheel is filled to the proper water level, and then the soap (dissolved) is added. The steam is turned off when the water boils (212° F or 100° C). The wheel is run for 40 minutes from the time it was started, and then the water is drawn off. The wheel is filled again to the proper level with water and the temperature raised to 140° F (60° C). At the end of 45 minutes from the start of the test, the water is again drawn off. The wheel is filled again to the proper level

¹⁶ See footnote 4, page 5.

with water and its temperature raised to 140° F (60° C). At the end of 55 minutes from the start of the test, the water is drawn off and the wheel is run for another 5 minutes, tumbling the wet samples in the wheel while the water drains. The specimens are removed from the wheel and rolled in a dry towel or other absorbent cloth to remove the excess water. Do not wring the specimens by hand or by means of a wringer as either method may distort the material and give unsatisfactory results. The specimens are placed horizontally on a screen or ventilated surface to dry. Do not hang the specimens vertically to dry. If a heated drying chamber is available, the specimens are dried therein, otherwise, in a current of air at room temperature from an electric fan. When the specimens are dry, they are laid out smoothly, without stretching, on a table, dampened, and allowed to lie for 5 minutes.

48. *Pressing*.—Either one of the two methods described below may be used in pressing the specimen. Whichever method of pressing is used, the specimens are allowed to cool before being measured again.

48a. *Hand pressing*.—The specimen is laid on a padded ironing table, all noticeable wrinkles are carefully smoothed out and it is pressed by raising and lowering the iron. Do not slide the iron back and forth on the specimen as this may distort the cloth. The iron temperature shall be between 275 and 300° F.¹⁷

48b. *Machine pressing*.—The specimen is laid on the bed of the press, all noticeable wrinkles are carefully smoothed out, and it is pressed by lowering the head of the machine. The specimen is removed from the bed of the machine in such a manner as to cause no strain on the cloth.

49. *Shrinkage*.—The three distances marked in each direction on the specimens are again measured. The average changes in dimensions in the warp and in the filling directions for each specimen are calculated. These are designated the warp and filling shrinkages, respectively, of the specimens.

50. *Reporting shrinkage in laundering of cotton and linen dress fabrics*.—The warp and filling shrinkages shall be reported separately in percent, to the nearest whole numbers.

XIV. SHRINKAGE IN LAUNDERING OF WASH DRESS FABRICS OTHER THAN COTTON AND LINEN

51. *Test specimen*.—The test specimen shall be taken no nearer the selvage than one-tenth of the width of the fabric. It shall be not less than 12 by 12 inches. A 10-inch square whose sides are placed parallel with the warp and filling, respectively, of the specimen is outlined on it preferably with the help of a rigid templet. The corners and midpoints of each side of the square are marked either with indelible ink applied with a fine pen or with a fine thread sewed into the fabric.

52. *Washing machine*.—The apparatus used shall consist of a cylinder, preferably of metal, approximately 13 inches high, having a diameter of about 8¼ inches (capacity 3 gallons). The cylinder shall be mounted in a vertical position on an axis, which is inclined 50° to the axis of the cylinder and rotated about this axis at a speed of 45 to 50 revolutions per minute. Provision is made for the cylinder reversing its direction every 3½ revolutions.

¹⁷ See footnote 3, page 4.

53. *Washing procedure.*—The machine is filled approximately one-third full of a solution containing 0.5 percent of neutral soap in soft water heated to $100 \pm 2^\circ \text{F}$. A specimen, prepared as in paragraph 51 and sufficient suitable worsted cloth¹⁸ in pieces approximately 12 by 12 inches to make a total dry load of 1 pound shall be placed in the machine. The machine is operated for 30 minutes. The specimen is removed and rinsed in three changes of water at $100 \pm 2^\circ \text{F}$.

54. *Pressing corresponding to household practice.*—The specimen is rolled in a dry towel or absorbent cotton cloth to remove excess moisture, spread on a padded ironing board, and pressed until dry with a flatiron having a temperature between 275 and 300°F .¹⁹ During pressing, the operator will exert the tension usual in hand ironing, tending to reshape and restore the specimen to its original size and shape, as is done in home pressing. The specimen is allowed to lie on a smooth, horizontal surface for 1 hour at room temperature.

55. *Shrinkage.*—The three distances marked in each direction on the specimens are again measured. The average changes in dimensions in the warp and in the filling directions for each specimen are calculated. These are designated the warp and filling shrinkages, respectively, of the specimens.

56. *Reporting shrinkage in laundering of dress fabrics other than cotton and linen.*—The warp and filling shrinkages shall be reported, in percent, to the nearest whole numbers.

XV. RESISTANCE TO YARN SLIPPAGE

57. *Test specimens.*—Three test specimens, each 4 inches wide by at least 14 inches long shall be cut from a specimen which has been laundered (see paragraph 53) or cleaned, dry or wet (see paragraph 41) with the long dimension in the direction of the yarns upon which the slippage is to be determined. If less force is required to slip the filling yarns on the warp yarns, as determined by the thumb and finger or any other suitable method, the 14-inch dimension shall be across the filling. However, if less force is required to slip the warp yarns on the filling yarns, then the 14-inch dimension shall be across the warp.

58. *Preparation of specimens.*

58a. Each specimen is folded back upon itself so that the distance from the fold to one end measures at least 4 inches and to the other end, at least 10 inches, care being taken to have the fold parallel to the crosswise yarns. About $\frac{1}{2}$ inch from the fold, a seam is sewed parallel with the crosswise yarns. The fold is cut either before or after making the seam.

58b. (A satisfactory procedure to obtain a correct seam when the fabric is such that a yarn can be drawn, is to draw out a crosswise yarn 4 inches from one end to mark the fold and then cut the specimen along the drawn yarn. The cloth guide attachment on the sewing machine is set for $\frac{1}{2}$ inch and the fold or cut edges aligned with it for sewing the seam.)

58c. The seam shall be sewed with a plain stitch (Stitch type 301 Federal Specification DDD-S-751) with 00 white, mercerized, cotton thread, 14 stitches to the inch, under uniform tension and as near

¹⁸ See footnote 14, page 9.

¹⁹ See footnote 3, page 4.

perpendicular to the filling or warp yarns as possible. The approximate needle dimension shall be 0.027 by 0.036 inch.

59. *Testing machine.*

59a. A motor-driven pendulum machine or a constant rate-of-load machine shall be used.

59b. The faces of the front members of the jaws shall measure 1 by 1 inch, and the faces of back members shall be 1 inch in the direction of the application of the load and 2 inches or more perpendicular to the direction of the application of the load. The jaws shall have smooth, flat faces with edges very slightly rounded to prevent cutting, and they should be pivoted to take the direction of loading force easily and smoothly.

59c. If a pendulum machine is used, the maximum capacity shall not exceed 25 kg (55 lb.). The jaws through which the load is applied shall move at a uniform speed of 12 ± 2 inches per minute.

59d. The machine shall be provided with an autographic recording device to trace a load-elongation curve.

59e. An auxiliary device is a 6-ounce clamp, $4\frac{1}{2}$ inches wide, used to hold the specimen taut and under slight tension (in the upper jaws of the machine) when fastening the lower jaws.

60. *Conditioning.*—The test specimen shall be placed in an atmosphere having a relative humidity of 65 percent at 70° F (21° C) for at least 4 hours. A tolerance of ± 2 percent is permitted in relative humidity and $+10^\circ$ F (6° C) in temperature. In cases of dispute, tests shall be conducted on test specimens which are in equilibrium with the foregoing standard atmosphere. Material shall be considered to be in equilibrium when it shows no progressive change in weight.

61. *Fabric elongation.*

61a. With the distance between the two pairs of jaws of the testing machine adjusted to 3 inches, the prepared test specimen, with the long portion uppermost, is placed symmetrically in the upper jaws so that the long dimension of the 10-inch part of the specimen is parallel to the direction of application of the load, and clamped so that the seam is 3 inches below the lower edge of the lower jaw. The 6-ounce clamp is attached to the specimen at a point beneath the lower jaw so that the uniform tension of that amount will be applied when the lower jaw is clamped tight.

61b. The load-elongation curve is obtained up to the breaking load, or up to 50 pounds if the specimen breaks at the higher load. This is the load-elongation curve for the fabric.

62. *Seam elongation.*—The test specimen is inserted symmetrically in the machine so that the seam is in a position parallel to the jaws and midway between the upper and lower jaws in a similar manner to paragraph 61a. The seam-elongation curve is recorded on the same record sheet used for recording the load-elongation curve.

63. *Resistance to yarn slippage.*

63a. The load at which the elongations of the fabric and the seam differ by $\frac{1}{4}$ inch more than the difference in the elongations at a load of 1 pound, is designated the resistance to yarn slippage.

63b. The resistance to yarn slippage of the cloth in either direction is the average of tests on three specimens. If a specimen slips in the jaws, breaks in the jaws, breaks at the edges of the jaws, or for any reason attributable to faulty operation a result differs markedly from the average for the set, that result is disregarded, another specimen taken and the result of this test included in the average. If the fabric

or the seam breaks before $\frac{1}{4}$ inch slippage occurs, the reported slippage shall be that at the breaking load.

63c. The resistance to yarn slippage may be obtained from the load-elongation curves by placing the points of a pair of dividers on the two curves at the points corresponding to a load of 1 pound. Increase the distance between the ends of the dividers by an amount corresponding to $\frac{1}{4}$ inch elongation and find the load at which the curves are separated by this distance.

64. *Reporting resistance to yarn slippage.*—The resistance to yarn slippage shall be reported in pounds to the nearest whole number and the report shall state whether the results are based on fabrics after being cleaned, dry or wet; or laundered.

XVI. STANDARD DYEINGS FOR REPORTING COLOR FASTNESS (STANDARD SAMPLES)

65. *Standard samples.*—The standard samples prescribed for judging the color fastness of dress fabrics were chosen from among the standard dyeings of the American Association of Textile Chemists and Colorists. They can be obtained from Prof. Louis A. Olney, chairman, Research Committee, AATCC, Lowell Textile Institute, Lowell, Mass., at a nominal cost.

66. *Color fastness to crocking.*

Standard sample DF1.—2 percent Alizarine Rubinol R; General Dyestuff Corporation; Colour Index No. 1091; dyed on wool.

Standard sample DF2.—2 percent Patent Blue AF, new; General Dyestuff Corporation; Colour Index No. 714; dyed on wool.

Standard sample DF3.—1 percent Victoria Blue BA, conc. new; General Dyestuff Corporation; Colour Index No. 729; dyed on wool.

67. *Color fastness to laundering of cotton and linen dress fabrics.*

Standard sample DF4.—(For test no. 1). 10 percent Indanthrene Violet BN ex. Paste, Colour Index No. 1163; dyed on cotton. (See 1934 Year Book, AATCC, page 88.)

Standard sample DF5.—(For test no. 2). 1 percent Diazo Fast Violet BL developed with beta naphthol; dyed on cotton. (See 1934 Year Book, AATCC, page 88.)

Standard sample DF6.—(For test no. 3). 1 percent Chrysophenine, conc. Colour Index No. 365; dyed direct with Glauber's salt on cotton. (See 1934 Year Book, AATCC, page 88.)

68. *Color fastness to laundering of wash dress fabrics other than cotton and linen.*

68a. *Fabrics predominately silk or rayon.*
Standard sample DF7.—2 percent Formyl Violet S4B; Colour Index No. 698; dyed on silk. (See 1934 Year Book, AATCC, page 97.)

68b. *Fabrics predominately wool.*

Standard sample DF8.—2½ percent Brilliant Milling Blue B; General Dyestuff Corporation; dyed on wool with Glauber's Salt and acetic acid. (See 1934 Year Book, AATCC, page 106.)

69. *Color fastness to light.*

NOTE.—Standard samples are listed in the order of increasing fastness.

Standard sample DF9.—2 percent Indigotine Conc.; Du Pont; Colour Index No. 1180; dyed on wool with sulphuric acid. (See 1934 Year Book, AATCC, page 118.)

Standard sample DF10.—1.2 percent Scarlet 2R Conc.; General Dyestuff Corporation; Colour Index No. 79; dyed on wool with sulphuric acid. (See 1934 Year Book, AATCC, page 118.)

Standard sample DF11.—2 percent Amaranth extra conc.; Geigy Co., Inc.; Colour Index No. 1184; dyed on wool with sulphuric acid. (See 1934 Year Book, AATCC, page 118.)

Standard sample DF12.—1.8 percent Sorbine Red X; General Dyestuff Corporation; Colour Index No. 54; dyed on wool with sulphuric acid. (See 1934 Year Book, AATCC, page 118.)

Standard sample DF13.—2.5 percent Dianmine, Fast Red FC; General Dye-stuff Corporation; Colour Index No. 419; dyed on wool with acetic acid. (See 1934 Year Book, AATCC, page 118.)

Standard sample DF14.—6 percent Indigosol O; Durand Huguenin & Co.; Colour Index No. 1177; dyed on wool. (See 1934 Year Book, AATCC, page 118.)

70. *Color fastness to perspiration.*—No standards available.

71. *Color fastness to cleaning, dry and wet.*—No standards available.

XVII. WARRANTY

72. The following illustrates the manner in which a laboratory may certify complete compliance with the commercial standard. Laboratories complying with the methods of testing and reporting as recorded in the standard may be readily identified by the following statement on their reports:

The ----- warrants that the results given in this report were obtained in accordance with Woven Dress Fabrics: Testing and Reporting, Commercial Standard CS59-36, as issued by the National Bureau of Standards of the U. S. Department of Commerce.

XVIII. NOTES

73. *Breaking strength—standard conditions.*—The test method outlined herein for breaking strength under standard atmospheric conditions is in agreement with all essential requirements of Standard General Methods for Testing Woven Textile Fabrics as issued by the American Society for Testing Materials (ASTM Designation D39-34) and approved as American Standard L5-1934 by the American Standards Association, and Textiles: Test Methods, Federal Specification, CCC-T-191, May 2, 1933.

74. *Breaking strength, wet.*—The test method outlined herein for the breaking strength of a fabric in the wet state is in agreement with all essential requirements of Method 5 (b), Uncorrected Wet Strength in the Proposed Tentative Method of Test for Strength of Rayon Woven Fabric When Wet, as proposed by section 2, subcommittee A-2, Committee D-13 of the American Society for Testing Materials. (Page 40, 1935 reprint Report of Committee D-13 on Textile Materials.)

75. *Color fastness to crocking (rubbing).*—The method outlined herein for color fastness to crocking (rubbing) complies in all essential requirements with the Method for Determining Fastness to Crocking as given in the 1934 Year Book of the American Association of Textile Chemists and Colorists.

76. *Color fastness to dry pressing.*—The method outlined herein for color fastness to dry pressing complies in all essential requirements with the standard method for determining Fastness to Dry and Wet Heat as given in the 1934 Year Book of the American Association of Textile Chemists and Colorists.

77. *Color fastness to laundering of cotton and linen dress fabrics.*—The method for determining color fastness to laundering of cotton and linen dress fabrics outlined herein complies in all essential requirements with Fastness Tests for Dyed or Printed Cotton as given in the 1934 Year Book of the American Association of Textile Chemists and Colorists.

78. *Color fastness to light.*—The method outlined herein for color fastness to light complies in all essential requirements with the method given in Textiles: Test Methods, Federal Specification, CCC-T-191, May 2, 1933.

79. *Shrinkage in laundering cotton and linen dress fabrics.*—The method outlined herein for the shrinkage in laundering cotton and linen dress fabrics complies in all essential requirements with the Standard Method For Determining Shrinkage In Washable Woven Cotton Fabrics as given in the 1934 Year Book of the American Association of Textile Chemists and Colorists; Standard General Methods of Testing Woven Textile Fabrics (ASTM designation D39-34) as issued by the American Society for Testing Materials and approved by the American Standards Association as American Standard L5-1934; and Textiles: Test Methods, Federal Specification, CCC-T-191, May 2, 1933.

80. *Resistance to yarn slippage.*—The method outlined herein for resistance to yarn slippage complies in all essential requirements with the methods for determining slippage under consideration by the American Society for Testing Materials.

EFFECTIVE DATE

The standard is effective as a basis for testing and reporting from April 15, 1936.

STANDING COMMITTEE

The following comprises the membership of the standing committee, which is to review, prior to circulation for acceptance, proposed revisions to keep the standard abreast of progress. Each association nominated its own representatives. Comment concerning the standard and suggestions for revision, may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards which acts as Secretary for the committee.

T. L. BLANKE (chairman), National Retail Dry Goods Association, 101 West 31st Street, New York, N. Y.

C. W. DORN, J. C. Penney Co., 330 West 34th Street, New York, N. Y. Representing National Retail Dry Goods Association.

Miss NANNENE GOWDY, Montgomery Ward & Co., Chicago, Ill.

Miss ELIZABETH WEIRICK, Sears, Roebuck & Co., Chicago, Ill.

A. H. SKINNER, Carson Pirie Scott & Co., 366 W. Adams Street, Chicago, Ill. Representing Wholesale Dry Goods Institute.

J. J. REUTLINGER, Hatch & Reutlinger, 366 Fifth Avenue, New York, N. Y. Representing American Association of Textile Technologists.

FRANK STUTZ, Better Fabrics Testing Bureau, Inc., 225 West 34th Street, New York, N. Y.

CHARLES L. SIMON, Industrial By-Products and Research Corp., Gimbel Bldg., 8th & Market Sts., Philadelphia, Pa.

HARRY LEVINE, Textile Testing and Research Laboratories, 24 West 26th Street, New York, N. Y.

D. E. DOUTY, U. S. Testing Company, Inc., 1415 Park Avenue, Hoboken, N. J. The Cotton Textile Institute, 320 Broadway, New York, N. Y.

(Representative to be named)

H. G. ZERVAS, Lewiston Bleachery and Dye Works, 40 Worth St., New York, N. Y. Representing National Association of Finishers of Textile Fabrics.

FRED NOEHEL, Botany Worsted Mills, Passaic, N. J. Representing National Association of Wool Manufacturers.

MORTIMER LANZIT, National Dress Manufacturers Association, 1450 Broadway, New York, N. Y.

FRED MUELLER, Stunzi Sons Silk Co., 1400 Broadway, New York, N. Y. Representing National Federation of Textiles, Inc.

Miss RUTH O'BRIEN, Bureau of Home Economics, U. S. Department of Agriculture, Washington, D. C. Representing American Home Economics Association.
Mrs. THOS. J. GILLOOLY, General Federation of Women's Clubs, 613 East Main Street, Clarksburg, W. Va.
Mrs. CARL L. (MAUDE W.) SCHRADER, Committee on Consumer Interests, National Council of Women of U. S., 58 Payson Road, Belmont, Mass.
Dr. PAULINE BEERY MACK, Pennsylvania State College, State College, Pa.
Miss ETHEL D. PHELPS, University of Minnesota, University Farm, St. Paul, Minn.
Geo. G. GAUBATZ, JR., National Association Institute of Dyeing and Cleaning Inc., Silver Spring, Md.
Dr. EPHRAIM FREEDMAN, R. H. Macy & Co., 34th and Broadway, New York, N. Y. Representing Committee D-13, American Society for Testing Materials.
HUGH CHRISTISON, Arlington Mills, 500 Broadway, Lawrence, Mass. Representing American Association of Textile Chemists and Colorists.

HISTORY OF PROJECT

During 1934 difficulties in adjusting differences of opinion between dress fabric manufacturers, converters, finishers, dress manufacturers, and distributors, as to causes of consumer complaints, led the National Retail Dry Goods Association under date of February 28, 1935, to request the cooperation of the National Bureau of Standards in establishing a commercial standard on methods of testing and reporting woven dress fabrics.

With the cooperation of the Fabrics Serviceability Committee of the Dress Code Authority, a committee representing three textile testing laboratories—namely, Better Fabrics Testing Bureau, Inc., Hatch and Reutlinger, and the United States Testing Co., Inc.—prepared a preliminary draft as a basis for discussion under the chairmanship of W. D. Appel of the National Bureau of Standards.

The proposed standard as drafted by the above Committee was considered at two public conferences, one in Washington on June 22, 1935, and the other in New York on September 27, 1935. With changes and additions to suit the composite recommendations of manufacturers, testing laboratories, distributors and consumers of woven dress fabrics, the proposed standard was adopted at the latter conference. The draft as adopted was submitted on October 31, 1935 to those concerned for written acceptance, and announcement of the success of the project was issued on April 15, 1936.

ACCEPTANCE OF COMMERCIAL STANDARD

This sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date _____

Division of Trade Standards,
National Bureau of Standards,
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS59-36 as our standard of practice for the testing and reporting of woven dress fabrics, with which we are directly concerned as a

Fabric manufacturer¹ Dress manufacturer¹ Testing laboratory¹ Distributor¹ Consumer¹

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature _____

(Kindly typewrite or print the following lines)

Name and title _____

Company _____

Street address _____

City and State _____

¹ Please designate which group you represent by drawing lines through the other four. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of the industry. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the industry as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: First, to act as an unbiased coordinator to bring all branches of the industry together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by companies representing a satisfactory majority of production, the success of the project is announced. If, however, in the opinion of the standing committee of the industry or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

Individuals and organizations listed below have indicated, in writing, acceptance of this specification as their standard of practice, but such endorsement does not signify that they may not find it necessary to deviate from the standard, nor does it signify that the testing laboratories so listed guarantee all of their test reports to conform with the requirements of this standard.

ASSOCIATIONS

American Association of Textile Technologists, New York, N. Y.
 American Home Economics Association, Washington, D. C.
 General Federation of Women's Clubs, Standardization Committee, Clarksburg, W. Va.
 Laundryowners National Association of the United States and Canada, Joliet, Ill. (In principle.)
 Mercerizers Association of America, New York, N. Y. (In principle.)
 National Association of Cotton Manufacturers, Boston, Mass.
 National Association Institute of Dyeing and Cleaning, Inc., Silver Spring, Md.
 National Association of Wool Manufacturers, New York, N. Y.
 National Council of Women, Belmont, Mass. (In principle.)
 National Retail Dry Goods Association, New York, N. Y.
 Pennsylvania Association of Cleaners and Dyers, York and Sharon, Pa. (In principle.)
 Ready-to-Wear Alliance, New York, N. Y.
 Specialty Stores Association, New York, N. Y.

FIRMS

Abbot Co., Amos, Dexter, Maine.
 American Dry Cleaner, Inc., The, Chicago, Ill.
 Angle Silk Mills, Inc., Rocky Mount, Va.
 Apponaug Co., The, Apponaug, R. I.
 Armour Institute of Technology, Chicago, Ill. (In principle.)
 Arnold Print Works, North Adams, Mass.
 Arsem, William C., Schenectady, N. Y.
 Art Dyers and Cleaners, Inc., Louisville, Ky.
 Aspinook Co., The, Jewett City, Conn. (In principle.)

Atlas Electric Devices Co., Chicago Ill. (In principle.)
 Bailey Department Stores Co., The, Cleveland, Ohio.
 Balloon Dye Works, San Diego, Calif.
 Baltic Mills Co., The, Baltic, Conn.
 Barnett Woolen Mills Co., I., Milwaukee, Wis.
 Bell & Beltz, Inc., Philadelphia, Pa.
 Better Fabrics Testing Bureau, Inc., New York, N. Y.
 Bigelow, Kent, Willard & Co., Boston, Mass.
 Birdsall Bros. Co., Honesdale, Pa.
 Blake's Dry Cleaning, Plainview, Nebr.
 Bliss Fabyan & Co., Inc., New York, N. Y.
 Blumenthal & Co., Inc., Sidney, New York, N. Y.
 Boessneck & Co., Inc., New York, N. Y.
 Boggs & Buhl, Pittsburgh, Pa.
 Boston Store (Herzfeld Phillipson Co.), Milwaukee, Wis.
 Botany Worsted Mills, Passaic, N. J.
 Brackett, M. R., New York, N. Y.
 Brehm & Stehle, Philadelphia, Pa.
 Broadway Department Store, Inc., Los Angeles, Calif.
 Broeman & Co., F. C., Cincinnati, Ohio.
 Brown-Dunkin Co., Tulsa, Okla.
 Buffalo Testing Laboratories, Inc., Buffalo, N. Y.
 Burkhart's Laundry and Dye Works, Houston, Tex.
 California, University of, Berkeley, Calif. (In principle.)
 Canova Silk Co., Scranton, Pa.
 Capitol-Barg Dry Cleaning Co., The, Cincinnati, Ohio. (In principle.)
 Carson Pirie Scott & Co., Chicago, Ill.
 Chehalis City Laundry, Chehalis, Wash.
 Cheney Bros., Manchester, Conn. (In principle.)
 Cherokee Spinning Co., Knoxville, Tenn.

- Chicago, University of, Chicago, Ill. (In principle.)
 Chiquola Manufacturing Co., Honea Path, S. C. (In principle.)
 Ciba Co., Inc., New York, N. Y. (In principle.)
 Cleveland Worsted Mills Co., The, Cleveland, Ohio. (In principle.)
 Cohn-Hall-Marx Co., New York, N. Y.
 College Cleaners and Dyers, Corvallis, Oreg. (In principle.)
 Cox & Fuller, New York, N. Y.
 Crawford Laundry Co., The, Bridgeport, Conn.
 Deavitt Laboratories, Inc., Chicago, Ill.
 Degering, Ed. F., West Lafayette, Ind.
 Delta Finishing Co., Philadelphia, Pa.
 Detroit Testing Laboratory, The, Detroit, Mich.
 Durfee Co., W. C., Boston, Mass. (In principle.)
 Eavenson & Levering Co., Camden, N. J.
 Ekroth Laboratories, Inc., Brooklyn, N. Y.
 Elite Cleaners and Dyers, Inc., Pasadena, Calif.
 Emporium, The, San Francisco, Calif.
 Esselen, Gustavus J., Inc., Boston, Mass.
 Exposition Cotton Mills, Atlanta, Ga.
 Fall River Bleachery, Fall River, Mass.
 Famous Barr Co., St. Louis, Mo.
 Fandel Co., St. Cloud, Minn.
 Farwell Bleachery, Lawrence, Mass.
 Fashion Co., The, Columbus, Ohio.
 Finishing Research Laboratories, Chicago, Ill.
 Fish Dry Cleaning Co., Baltimore, Md.
 Fishburn-Oriental Dyeing and Dry Cleaning Co., Dallas, Tex.
 Frankford Worsted Mills, Philadelphia, Pa.
 Froehling & Robertson, Inc., Richmond, Va.
 Gable Co., The Wm. F., Altoona, Pa.
 Geigy Co., Inc., New York, N. Y.
 General Dyestuff Corporation, New York, N. Y. (In principle.)
 General Testing Laboratories, Inc., Detroit, Mich.
 Georgia School of Technology, Atlanta, Ga.
 Globe Mills Co., Mount Holly, N. C.
 Goodnow Co., W. L., Keene, N. H.
 Gore & Wolf, Beaumont, Tex.
 Great Falls Bleachery and Dye Works, Inc., Somersworth, N. H.
 Great Lakes Thread Co., Detroit, Mich. (In principle.)
 Grosvenor Laboratories, Inc., William M., New York, N. Y.
 Hager & Bro., Inc., Lancaster, Pa.
 Harris Co. Continental Dye Works, T. A., Philadelphia, Pa.
 Harzfeld's, Inc., Kansas City, Mo.
 Hatch & Reutlinger, New York, N. Y.
 Hawkeye Laundry Co., Boone, Iowa.
 Hecht Co., The, Washington, D. C.
 Hermes Co., J. W., New York, N. Y.
 Herron Co., The James H., Cleveland, Ohio.
 Hess, Goldsmith & Co., Inc., New York, N. Y.
 High Co., J. M., Atlanta, Ga.
 Hochstadter Laboratories, Inc., New York, N. Y.
 Holman's Department Store, Inc., Pacific Grove, Calif.
 Holmes Co., Ltd., D. H., New Orleans, La.
 Houston, Inc., Better Business Bureau of, Houston, Tex. (In principle.)
 Hunt Co., Robert W., Chicago, Ill.
 Huyck & Sons, F. C., Albany, N. Y.
 Industrial By-Products and Research Corporation, Philadelphia, Pa.
 Jordan Marsh Co., Boston, Mass.
 Kespohl Mohrenstecher Co., Quincy, Ill.
 Lafayette College, Easton, Pa. (In principle.)
 Lane Cotton Mills Co., New Orleans, La. (In principle.)
 Lansburgh & Bro., Washington, D. C.
 Lanza Silk Dyeing Co., Paterson, N. J.
 Laucks Laboratories, Inc., Seattle, Wash.
 La Wall & Harrison, Philadelphia, Pa.
 Leonard & Co., W. C., Saranac Lake, N. Y.
 Lewis Dry Cleaning System, Louisville, Ky.
 Lewiston Bleachery and Dye Works, Lewiston, Maine.
 Lilienthal & Co., Inc., Felix, New York, N. Y.
 Lintz Dry Goods Co., Guthrie, Okla.
 Little, Inc., Arthur D., Cambridge, Mass.
 Loeser & Co., Inc., Frederick, Brooklyn, N. Y.
 Lord & Taylor, New York, N. Y.
 Los Angeles Testing Laboratory, Los Angeles, Calif.
 Lowell Bleachery South, Griffin, Ga.
 Lungstras Dyeing and Cleaning Co., St. Louis, Mo.
 Lux Laboratories, The, Cambridge, Mass. (In principle.)
 Maas Laboratories, Arthur R., Los Angeles, Calif.
 Madsen Cleaning Co., Provo, Utah.
 Maine, University of, Orono, Maine.
 Maison Blanche Co., New Orleans, La.
 Mammoth Department Store, Shawnee, Okla.
 Mansmann Co., Albert J., Pittsburgh, Pa.
 Manville Jenckes Corporation, Manville, R. I.
 Marshall & Swift, Inc., Mason City, Iowa.
 Marting Bros. Co., The, Portsmouth, Ohio.

- Mauersberger, Herbert R., New York, N. Y. (In principle.)
 Maywald, Frederick J., Carlstadt, N. J.
 McCurdy & Co., Inc., Rochester, N. Y.
 Melville Woolen Co., Sykesville, Md. (In principle.)
 Merrimac Mills, Methuen, Mass.
 Merrimack Manufacturing Co., Lowell, Mass.
 Miles Laboratory, George W., Boston, Mass.
 Miner Laboratories, The, Chicago, Ill.
 Minnesota, University of, Division of Home Economics, St. Paul, Minn. (In principle.)
 Missouri, University of, Columbia, Mo.
 Model Family Laundries, Inc., New Haven, Conn.
 Montgomery Ward & Co., Chicago, Ill.
 Moore Co., Harry C., Nevada, Mo.
 Munitex Corporation, The, Paterson, N. J. (In principle.)
 Munro Dry Cleaning Co., Beaumont, Tex.
 New Orleans, Inc., Better Business Bureau of, New Orleans, La. (In principle.)
 New York University, New York, N. Y. (In principle.)
 New York Wetpruf Corporation, New York, N. Y.
 Norfolk Testing Laboratories, Inc., Norfolk, Va.
 Norris Cotton Mills Co., Catechee, S. C.
 Oregon State College, Corvallis, Oreg.
 Osborn Cleaners, Owosso, Mich.
 Osborne Laboratories, Raymond G., Los Angeles, Calif.
 Otis Co., Ware, Mass.
 Outlet Co., The, Providence, R. I.
 Pacific Chemical Laboratories, San Francisco, Calif.
 Pacific Mills, New York, N. Y.
 Patzig Testing Laboratories, Des Moines, Iowa.
 Pease Laboratories, Inc., New York, N. Y.
 Peerless Cleaners, Carbondale, Ill.
 Penney Co., Inc., J. C., New York, N. Y.
 Penniman & Browne, Baltimore, Md.
 Peoria, Better Business Bureau of, Peoria, Ill. (In principle.)
 Perry Testing Laboratory, Detroit, Mich.
 Petri's Master Cleaners, North Adams, Mass.
 Petri's Odorless Cleaners, Long Beach, Calif.
 Piedmont Processing Co., Belmont, N. C. (In principle.)
 Pittsburgh Testing Laboratory, Pittsburgh, Pa.
 Poole Co., Guy, Asheville, N. C.
 Poz, Wm. Matthew, Westwood, N. J.
 Providence Dyeing, Bleaching and Calendering Co., Providence, R. I.
 Pullar, Robert Taft, New York N. Y. (In principle.)
 Quality Dry Cleaners of Lakeland, Inc., Lakeland, Fla.
 Reliance Dyeing and Finishing Corporation, Covington, Ky. (In principle.)
 Renfrew Bleachery, Travelers Rest, S. C.
 Rhode Island State College Experiment Station, Kingston, R. I.
 Rike Kumler Co., The, Dayton, Ohio.
 Riverside Manufacturing Co., St. Louis, Mo. (In principle.)
 Rogers, T. M. & B. A., Florence, Ala.
 Sadtler & Son, Inc., Samuel P., Philadelphia, Pa.
 St. Louis Sampling and Testing Works, St. Louis, Mo.
 Sanger Bros., Dallas, Tex.
 Sayer Bros. Co., Wilmington, Del.
 Sehuster & Co., Inc., Ed., Milwaukee, Wis.
 Scott's Cleaning Co., St. Louis, Mo.
 Scranton Better Business Bureau, Scranton, Pa. (In principle.)
 Scruggs Vandervoort Barney Dry Goods Co., St. Louis, Mo.
 Sears, Roebuck & Co., Chicago, Ill.
 Shepler's, Inc., Detroit, Mich.
 Shull's Dry Cleaning Works, York, Pa. (In principle.)
 Sibley, Lindsay & Curr Co., Rochester, N. Y.
 Silk and Rayon Digest, New York, N. Y.
 Silverstein's, Inc., New Orleans, La.
 Skidmore College, Saratoga Springs, N. Y.
 Skinner & Sherman, Inc., Boston, Mass.
 Smith-Roberts Co., Griffin, Ga.
 Snell, Inc., Foster D., Brooklyn, N. Y.
 Steketee, Paul & Son, Grand Rapids, Mich. (In principle.)
 Stevens & Co., Chas. A., Chicago, Ill.
 Stifel, J. L. & Son, Inc., Wheeling, W. Va. (In principle.)
 Stillman & Van Sieten, Inc., New York, N. Y.
 Stone & Thomas, Wheeling, W. Va.
 Strakus Joliet Cleaners and Dyers, Joliet, Ill.
 Strasburger & Siegel, Baltimore, Md.
 Suncook Mills, Suncook, N. H.
 Tacoma Better Business Bureau, Tacoma, Wash. (In principle.)
 Textile Testing and Research Laboratories, New York, N. Y.
 Tompkins Dry Goods Co., Middletown, N. Y. (In principle.)
 Townson, A. M. & Co., Inc., Philadelphia, Pa.
 Troy Laundry Co., Casper, Wyo.

Twining Laboratories, The, Fresno,
Calif.
United States Finishing Co., The,
Providence, R. I.
United States Testing Co., Inc.,
Hoboken, N. J.
Wahl Store, J. B., Bellingham, Wash.
Walker Dyeing and Bleaching Co.,
Chelsea, Mass.
Wallis Cleaning Service, Tucson, Ariz.
Wardrobe, The (Clint Adler), Ottum-
wa, Iowa.
Watkins, E. L. & Co., Portland, Maine.
Western Precipitation Co., Los Angeles,
Calif.

Whisonant's, Gaffney, S. C.
Whitehead Silks, Inc., Harrisburg, Pa.
Wieboldt Stores, Inc., Chicago, Ill.
Winkelman's Style Shop, Inc., Sault
Ste. Marie, Mich.
Wolf & Dessauer Co., Fort Wayne, Ind.

U. S. GOVERNMENT

District of Columbia, Government of
the, Washington, D. C. (In princi-
ple.)
Treasury Department, U. S., Wash-
ington, D. C.
War Department, Washington, D. C.

COMMERCIAL STANDARDS

CS no.	Item	CS no.	Item
0-30.	The commercial standards service and its value to business.	33-32.	Knit underwear (exclusive of rayon).
1-32.	Clinical thermometers (second edition).	34-31.	Bag, case, and strap leather.
2-30.	Mopsticks.	35-31.	Plywood.
3-28.	Stoddard solvent.	36-33.	Fourdrinier wire cloth (second edition).
4-29.	Staple porcelain (all-clay) plumbing fixtures.	37-31.	Steel bone plates and screws.
5-29.	Steel pipe nipples.	38-32.	Hospital rubber sheeting.
6-31.	Wrought-iron pipe nipples (second edition).	39-32.	Wool and part wool blankets.
7-29.	Standard weight malleable iron or steel screwed unions.	40-32.	Surgeon's rubber gloves.
8-33.	Gage blanks (second edition).	41-32.	Surgeon's latex gloves.
9-33.	Builders' template hardware (second edition).	42-35.	Fiber insulating board (second edition).
10-29.	Brass pipe nipples.	43-32.	Grading of sulphonated oils.
11-29.	Regain of mercerized cotton yarns.	44-32.	Apple wraps.
12-35.	Fuel oils (third edition).	45-33.	Douglas fir plywood.
13-30.	Dress patterns.	46-36.	Hosiery lengths and sizes (second edition).
14-31.	Boys' blouses, button-on waists, shirts, and junior shirts.	47-34.	Marking of gold-filled and rolled-gold-plate articles other than watch cases.
15-29.	Men's pajamas.	48-34.	Domestic burners for Pennsylvania anthracite (underfed type).
16-29.	Wall paper.	49-34.	Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
17-32.	Diamond core drill fittings (second edition).	50-34.	Binders board for bookbinding and other purposes.
18-29.	Hickory golf shafts.	51-35.	Marking articles made of silver in combination with gold.
19-32.	Foundry patterns of wood (second edition).	52-35.	Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
20-36.	Staple vitreous china plumbing fixtures (second edition).	53-35.	Colors and finishes for cast stone.
21-36.	Interchangeable ground-glass joints, stopcocks and stopper (third edition).	54-35.	Mattresses for hospitals.
22-30.	Builders' hardware (nontemplate).	55-35.	Mattresses for institutions.
23-30.	Feldspar.	56-36.	Oak flooring.
24-30.	Standard screw threads.	57-36.	Book cloths, buckrams and impregnated fabrics for bookbinding purposes except library bindings.
25-30.	Special screw threads.	58-36.	Woven elastic fabrics for use in overalls (over all elastic webbing).
26-30.	Aromatic red cedar closet lining.	59-36.	Woven dress fabrics: testing and reporting.
27-36.	Mirrors.		
28-32.	Cotton fabric tents, tarpaulins, and covers.		
29-31.	Staple seats for water-closet bowls.		
30-31.	Colors for sanitary ware.		
31-35.	Wood shingles (third edition).		
32-31.	Cotton cloth for rubber and pyroxylin coating.		

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of every day practice in their industry, may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington, D. C.